

What is claimed is:

1. A high frequency crystal oscillator increasing levels of higher harmonic components
5 against a level of a fundamental frequency of a generating circuit using a quartz-crystal element, selecting any higher harmonic component by a surface acoustic wave filter, amplifying the selected higher harmonic component, and obtaining a
10 high frequency oscillation output signal, wherein
a piezo-electric substrate that composes the surface acoustic wave filter is a crystal substrate.
2. A high frequency crystal oscillator,
15 comprising:
a crystal oscillating unit causing a center voltage of an oscillation output signal to be higher than the center voltage of a power supply voltage so as to distort an output signal and
20 output the output signal; and
a surface acoustic wave filter extracting a particular frequency component of the output signal of the crystal oscillating unit, a piezo-electric substrate of the surface acoustic wave filter being
25 a crystal substrate.

3. A high frequency crystal oscillator, comprising:

an oscillating unit using a quartz-crystal
5 element;

an amplifying unit amplifying higher harmonic components of an output signal of the oscillating unit; and

a surface acoustic wave filter selectively
10 outputting a particular frequency higher harmonic component of an output signal amplified by the amplifying unit, a piezo-electric substrate of the surface acoustic wave filter being a crystal substrate.

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4. The high frequency crystal oscillator as set forth in claim 3, wherein

the amplifying unit amplifies the higher harmonic component of the output signal using a
20 saturation region of input and output characteristics thereof.

5. A high frequency crystal oscillator, comprising:

25 crystal oscillating means for causing a center

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voltage of an oscillation output signal to be higher than the center voltage of a power supply voltage so as to distort an output signal and output the output signal; and

5 surface acoustic wave filter means for extracting a particular frequency component of the output signal of the crystal oscillating means, a piezo-electric substrate of the surface acoustic wave filter means being a crystal substrate.

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6. A high frequency crystal oscillator, comprising:

oscillating means for using a quartz-crystal element;

15 amplifying means for amplifying higher harmonic components of an output signal of the oscillating means; and

surface acoustic wave filter means for selectively outputting a particular frequency
20 higher harmonic component of an output signal amplified by the amplifying means, a piezo-electric substrate of the surface acoustic wave filter being a crystal substrate.

25 7. A high frequency signal oscillating method,

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comprising:

distorting an output signal of an oscillating circuit using a crystal oscillator and outputting the output signal; and

5 extracting a particular frequency component from the output signal by supplying the output signal to a surface acoustic wave filter having a piezo-electric substrate that is a crystal substrate.

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8. A high frequency signal oscillating method, comprising the steps of:

15 amplifying higher harmonic components of an output signal of an oscillating unit using a quartz-crystal element; and

20 extracting a particular frequency component from the output signal by supplying the amplified output signal to a surface acoustic wave filter having a piezo-electric substrate that is a crystal substrate .

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